

Light Measurement Report

Print date: 7-1-2025

Measurement date and time: 7-1-2025 08:58:47 – Measurement no. VFR-250107-2732-MS

Measurement tracking No. and Link: [VT250107-009473](#)

Operator:



Laboratory and Equipment

Laboratory Owner and Location

Goniospectrometer System and Type

Sensor Name, Calibr. Date and Serial No.

Spectrometer Manufacturer and Model

Viso Systems, Copenhagen V, Denmark

LabSpion – Type C, horizontal

LabSensor Model2 – 11-1-2024 – 3130191315

Ibsen Photonics, Denmark – Freedom VIS (Custom Viso)

Measurement Conditions

Number of C-planes and Resolution

γ (gamma)-Resolution

Test Distance

Input Power, Power and Displ. Factors

Input RMS Voltage and Current

Frequency of Input Power

Warm-up Time and Variation

72 planes – 5°

5°

2,00 m

3,7 W – PF 0,45 – DPF 0,97

230 V – 0,036 A

50 Hz

Lamp stabilized in 15 min 2 sec – 2,0%

Tested Light Source

Product Name

Item No. and Manufacturer

Product Description (line 1)

FUT103-2700K

FUT103-2700K – Dutchfulfillment

Mi-Light | GU10 | RGB+CCT | 4W

Main Light Measurement Results

Output – Total Lumen (Up% / Down%)

Efficiency

Peak Intensity and Beam Angle

Correlated Color Temperature, Target/Measured

Color Rendering Index

Color Rendering TM30-18

Color Shift, CIE duv and MacAdam Steps

Flicker

347 lm – 0,19% / 99,81%

93 lm/W

1094 cd – 26,9°

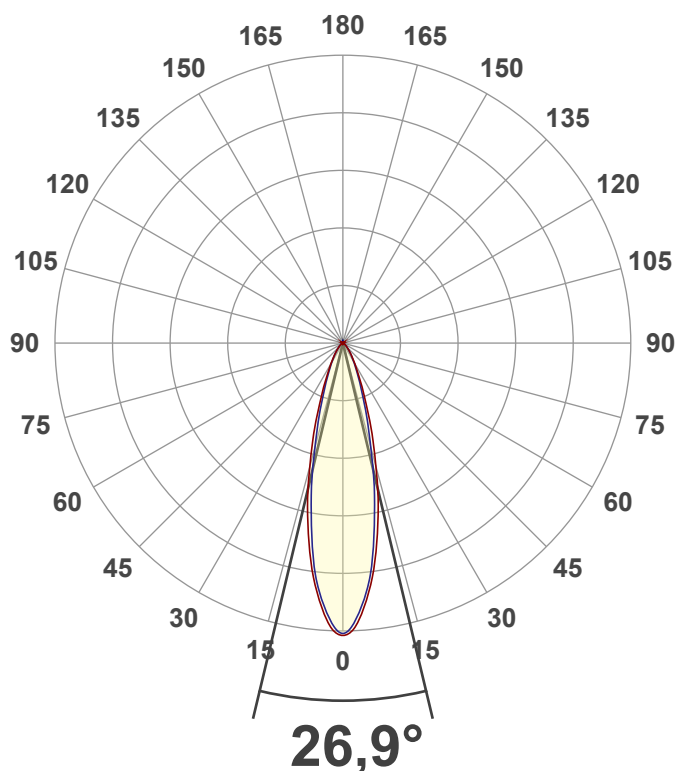
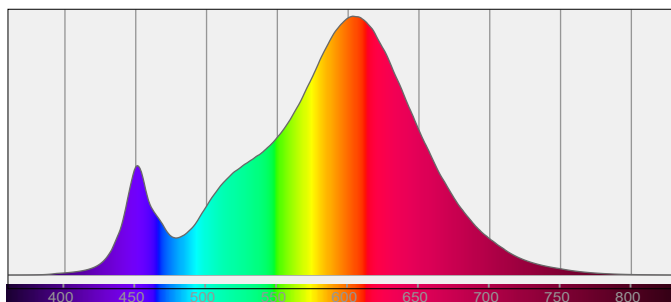
CCT = 2700 K / 2767 K

CRI 80,9

R_f 83,6 – R_g 96,1

Duv -0,0010 – SDCM 3,2

SVM 0,02 – PstLM 0,07



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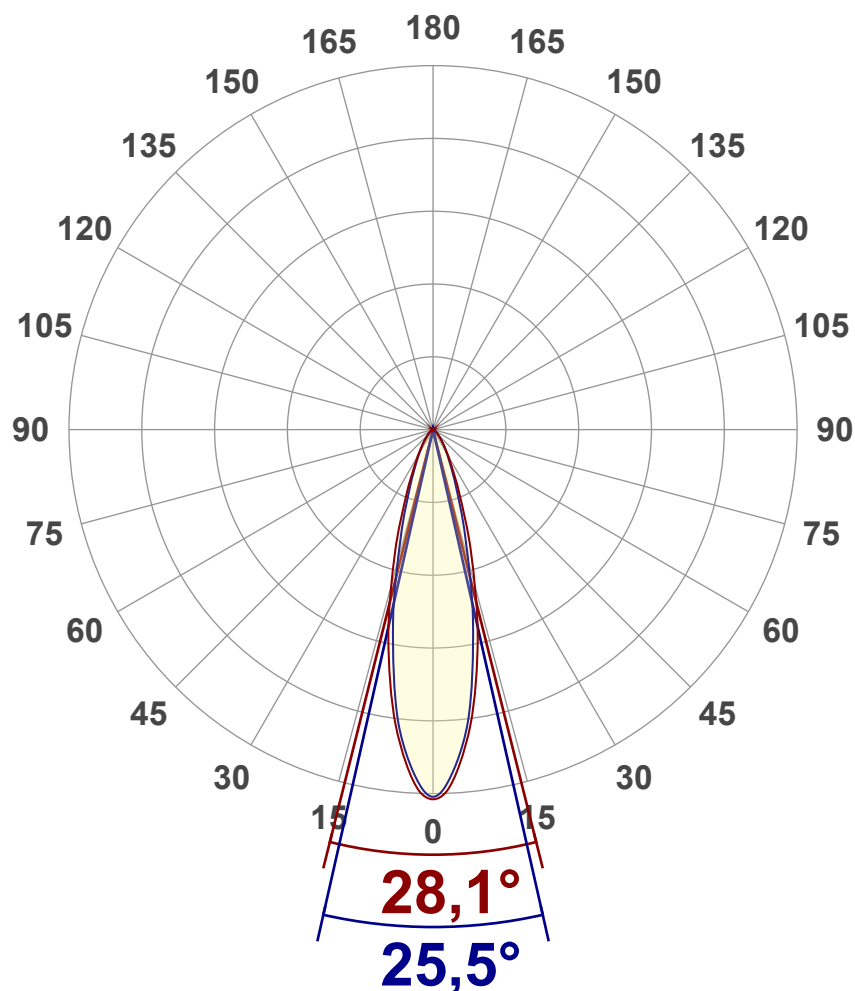
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Operator:



Luminous Intensity diagram

Unit: 0-100% of peak intensity



Main Values

Output (total Lumen)	347 lm
Lumen Up% / Down%	0,19% / 99,81%
Peak Intensity	1094 cd
Beam Angle (50%)	26,9°
Beam Angle (90%)	25,5°
Beam Angle (10%)	27,6°

Cut-off Angle

Average 2,5%	84,8°
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Field Angle

Average 10%	55,3°
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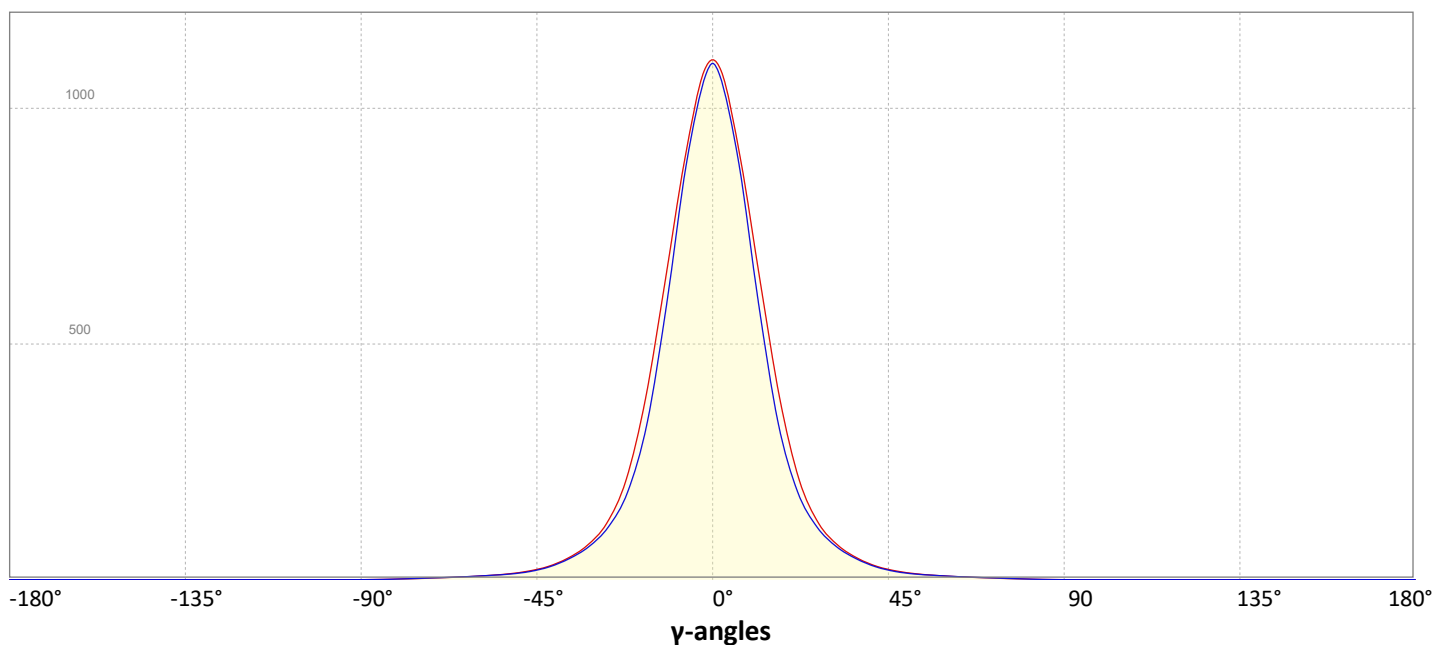
Intensity Ratio

In 120° cone	97,0%
In 90° cone	92,4%

C000-C180

C090-C270

Linear distribution diagram - Intensity (candela) vs γ-angle

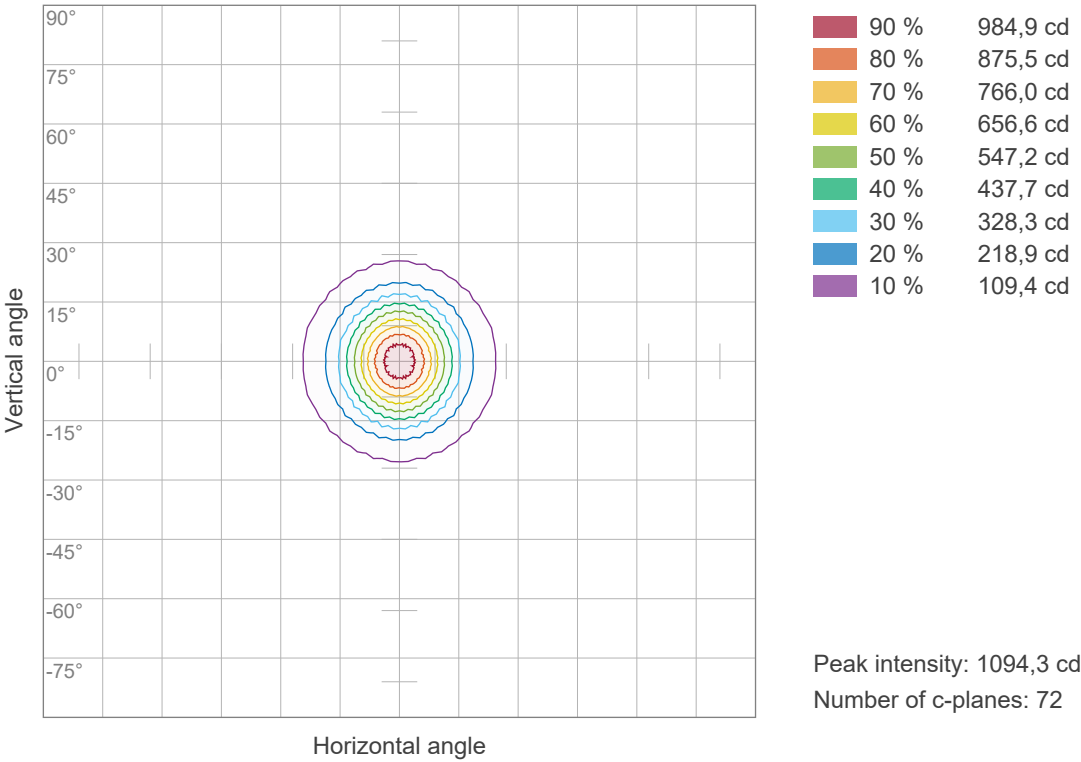


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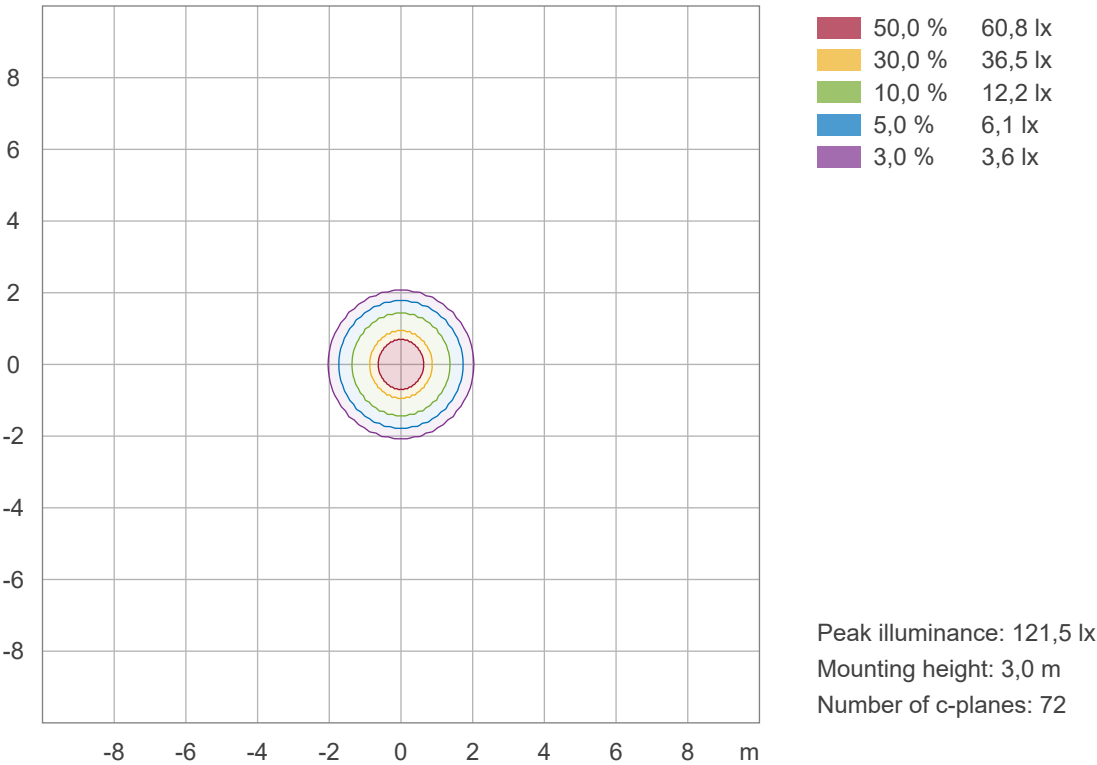
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Iso-intensity Diagram (Iso-candela)



Iso-illuminance Diagram (Iso-lux)



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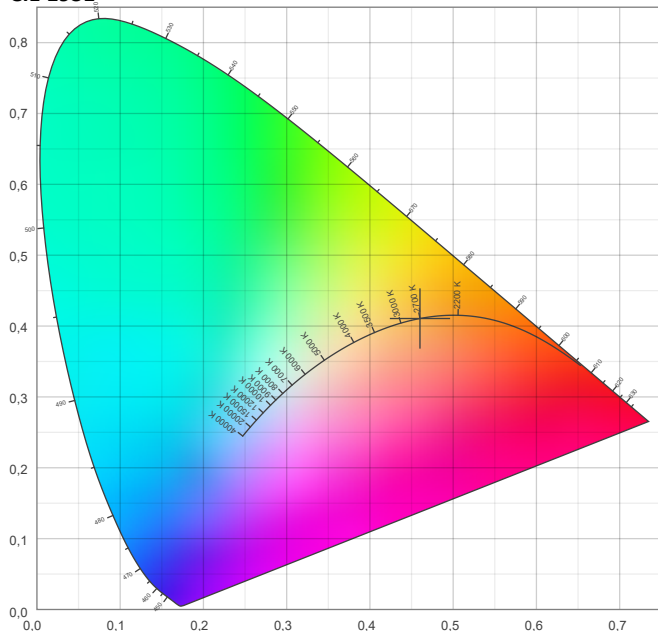


Color details

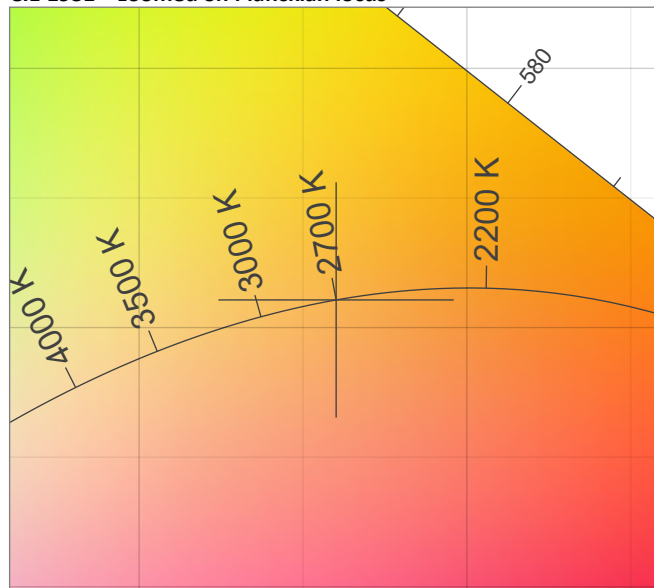
Correlated Color Temperature, Target CCT = 2700 K
Correlated Color Temperature, Measured CCT = 2767 K
Color Rendering Index CRI 80,9
Color Rendering Index, R9 (red component) R9 = -1,3
Color Rendering TM30-18 R_f 83,6 – R_g 96,1
Color Quality Scale CQS = 80,3

MacAdam Steps
Color coordinates CIE 1931 (x;y) = (0,460;0,411)
Color coordinate CIEs 1960 (u;v) = (0,263;0,352)
Color deviation from BBL Duv = -0,0010
Color coordinate CIEs 1976 (CIELUV) (u';v') = (0,263;0,527)

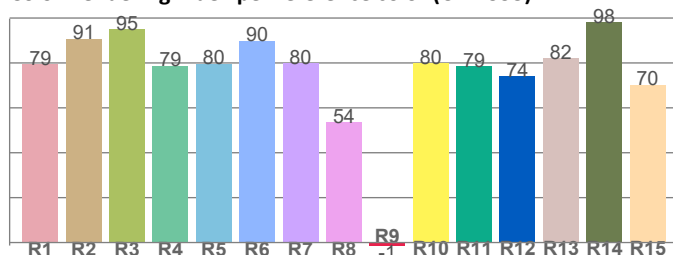
CIE 1931



CIE 1931 – zoomed on Planckian locus



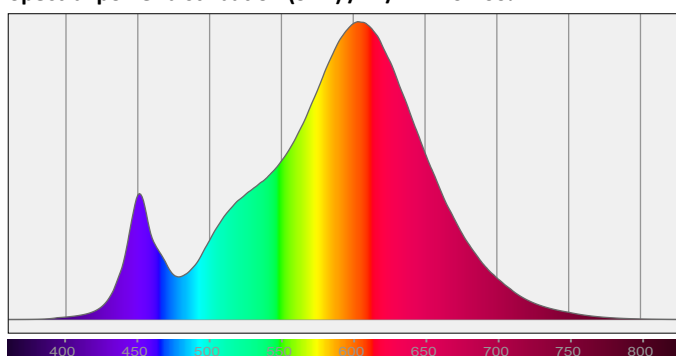
Color Rendering Index per reference color (CIE 1995)



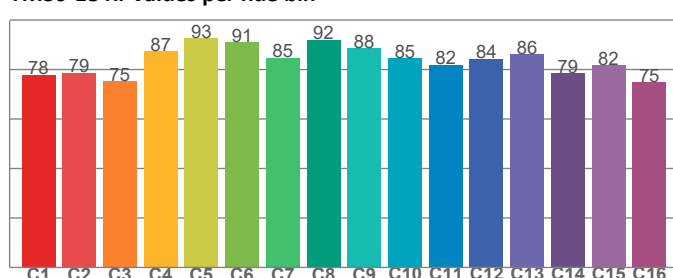
CRI R values, only R1-R8 are used to calculate final CRI value

R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14	R15
79,4	90,8	95,0	78,8	79,7	89,8	79,9	53,7	-1,3	79,8	78,6	74,0	82,1	98,0	70,3

Spectral power distribution (SPD) / W/nm – 0-100%



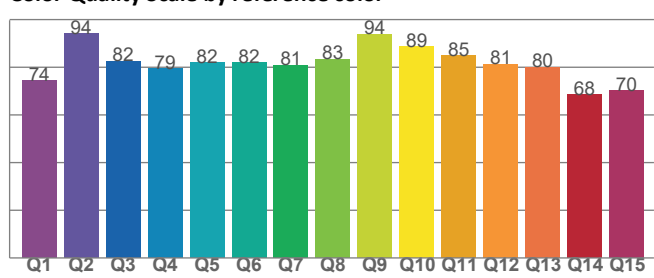
TM30-18 Rf-values per hue bin



TM30 C values, 16 binned values out of total of 99 C values

C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16
77,9	78,8	75,2	87,4	92,5	91,1	84,7	92,1	88,5	84,7	82,0	84,4	86,2	78,5	81,6	75,0

Color Quality Scale by reference color



CQS Q values

Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11	Q12	Q13	Q14	Q15
74,4	94,1	82,5	79,5	82,0	81,9	80,9	83,3	93,9	88,6	84,8	81,2	80,0	68,4	70,2

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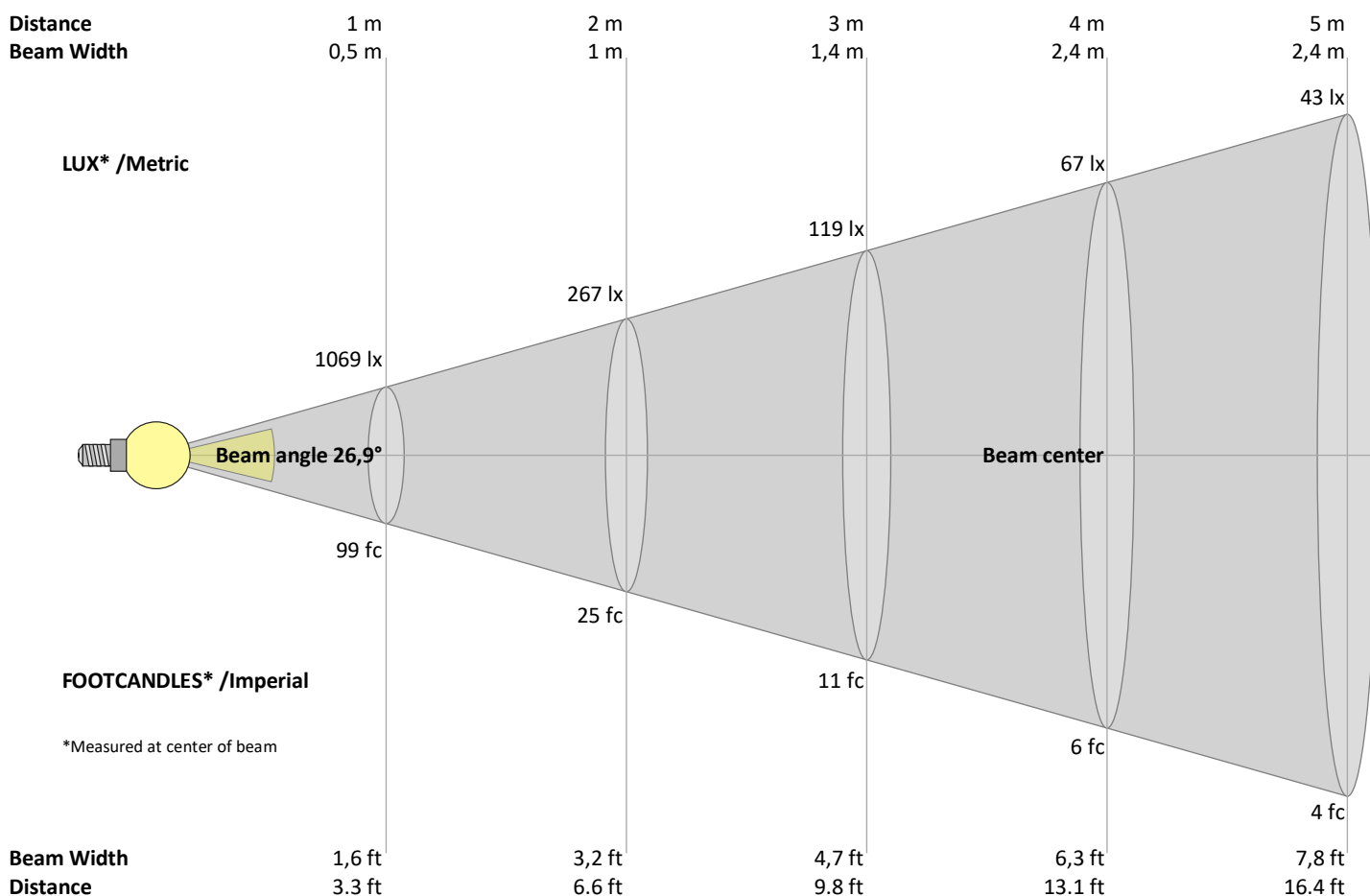
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Beam Details



Beam intensities from 1 – 20 m

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	m
3,3	6,6	9,8	13,1	16,4	19,7	23	26,2	29,5	32,8	36,1	39,4	42,7	45,9	49,2	52,5	55,8	59,1	62,3	65,6	ft
1069	267	119	67	43	30	22	17	13	11	9	7	6	5	5	4	4	3	3	3	lux
99,3	24,8	11	6,2	4	2,8	2	1,6	1,2	1	0,8	0,7	0,6	0,5	0,4	0,4	0,3	0,3	0,3	0,2	fc

Intensities in 0° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
1069	1079	1010	934	847	744	641	542	443	356	287	217	178	141	111	93	74	63	52	42	cd
100%	101%	95%	87%	79%	70%	60%	51%	41%	33%	27%	20%	17%	13%	10%	9%	7%	6%	5%	4%	of 0°val

Intensities in 90° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
1069	1061	985	909	807	689	573	472	371	297	238	183	153	123	101	84	69	58	48	40	cd
100%	99%	92%	85%	75%	64%	54%	44%	35%	28%	22%	17%	14%	11%	9%	8%	6%	5%	5%	4%	of 0°val

Intensities in 180° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
1069	1079	1010	934	847	744	641	542	443	356	287	217	178	141	111	93	74	63	52	42	cd
100%	101%	95%	87%	79%	70%	60%	51%	41%	33%	27%	20%	17%	13%	10%	9%	7%	6%	5%	4%	of 0°val

Intensities in 270° c-plane

0°	2°	4°	6°	8°	10°	12°	14°	16°	18°	20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	γ
1069	1061	985	909	807	689	573	472	371	297	238	183	153	123	101	84	69	58	48	40	cd
100%	99%	92%	85%	75%	64%	54%	44%	35%	28%	22%	17%	14%	11%	9%	8%	6%	5%	5%	4%	of 0°val

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Light Planning – UGR table

Uncorrected, comprehensive UGR table according to 117-1995

Reflectances											
p Ceiling		70	70	50	50	30	70	70	50	50	30
p Walls		50	30	50	30	30	50	30	50	30	30
p Floor		20	20	20	20	20	20	20	20	20	20
Room size		Viewed Crosswise					Viewed Endwise				
H = mounting height above eye level		(Viewing direction orthogonal to lamp length axis)					(Viewing direction parallel to lamp length axis)				
X	Y										
2H	2H	16,4	16,9	16,5	17,1	17,3	16,2	16,8	16,3	17,0	17,2
	3H	16,6	17,3	17,0	17,5	17,7	16,5	17,2	16,8	17,4	17,6
	4H	16,7	17,4	17,1	17,6	17,9	16,6	17,3	17,0	17,5	17,8
	6H	16,8	17,4	17,1	17,7	18,1	16,8	17,4	17,1	17,7	18,0
	8H	16,8	17,4	17,2	17,7	18,1	16,8	17,3	17,1	17,7	18,0
	12H	16,8	17,3	17,2	17,7	18,1	16,8	17,3	17,1	17,6	18,1
4H	2H	16,3	17,0	16,7	17,2	17,5	16,2	16,9	16,6	17,1	17,3
	3H	16,9	17,4	17,2	17,8	18,2	16,8	17,3	17,1	17,7	18,1
	4H	17,0	17,5	17,4	17,9	18,4	17,0	17,5	17,4	17,9	18,4
	6H	17,1	17,7	17,6	18,0	18,3	17,1	17,7	17,6	18,0	18,3
	8H	17,1	17,6	17,6	18,0	18,3	17,1	17,6	17,7	18,0	18,3
	12H	17,1	17,5	17,6	17,9	18,4	17,1	17,5	17,6	17,9	18,4
8H	4H	17,0	17,5	17,5	17,9	18,2	17,0	17,5	17,5	17,8	18,2
	6H	17,2	17,5	17,7	18,0	18,5	17,2	17,6	17,7	18,0	18,6
	8H	17,3	17,6	17,8	18,1	18,7	17,3	17,6	17,8	18,1	18,7
	12H	17,3	17,5	17,9	18,0	18,6	17,3	17,5	17,9	18,1	18,7
12H	4H	17,0	17,4	17,5	17,8	18,2	17,0	17,3	17,5	17,7	18,2
	6H	17,3	17,5	17,8	18,0	18,7	17,3	17,5	17,8	18,0	18,7
	8H	17,3	17,5	17,9	18,0	18,6	17,3	17,5	17,9	18,0	18,6
Variations with the observer position for the luminaire spacings, S:											
S = 1.0H		1,9 / -1,4					1,8 / -1,3				
S = 1.5H		3,7 / -2,0					3,5 / -1,9				
S = 2.0H		5,3 / -2,7					5,0 / -2,4				

Coefficients of Utilization

Ceiling reflectance	80			70			50			30			10			0		
Wall reflectance	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
Floor reflectance	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20	0
RCR		(RCR: Room Cavity Ratio)			Room Values are expressed as percentage of Lumen delivered to the task surface													
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	114	111	109	107	111	109	107	105	105	103	102	101	100	99	98	97	96	94
2	109	104	100	97	107	103	99	96	99	97	94	96	94	92	94	92	90	89
3	104	98	94	90	102	97	93	89	94	91	88	92	89	87	90	87	85	84
4	100	93	88	84	98	92	87	84	90	86	83	88	84	82	86	83	81	79
5	96	88	83	79	94	87	83	79	86	81	78	84	80	78	82	79	77	76
6	92	84	79	75	91	83	78	75	82	78	74	81	77	74	79	76	73	72
7	88	80	75	72	87	80	75	71	79	74	71	77	73	71	76	73	70	69
8	85	77	72	68	84	77	72	68	75	71	68	75	71	68	74	70	67	66
9	82	74	69	66	81	74	69	65	73	68	65	72	68	65	71	67	65	64
10	80	71	66	63	79	71	66	63	70	66	63	69	65	63	69	65	62	61

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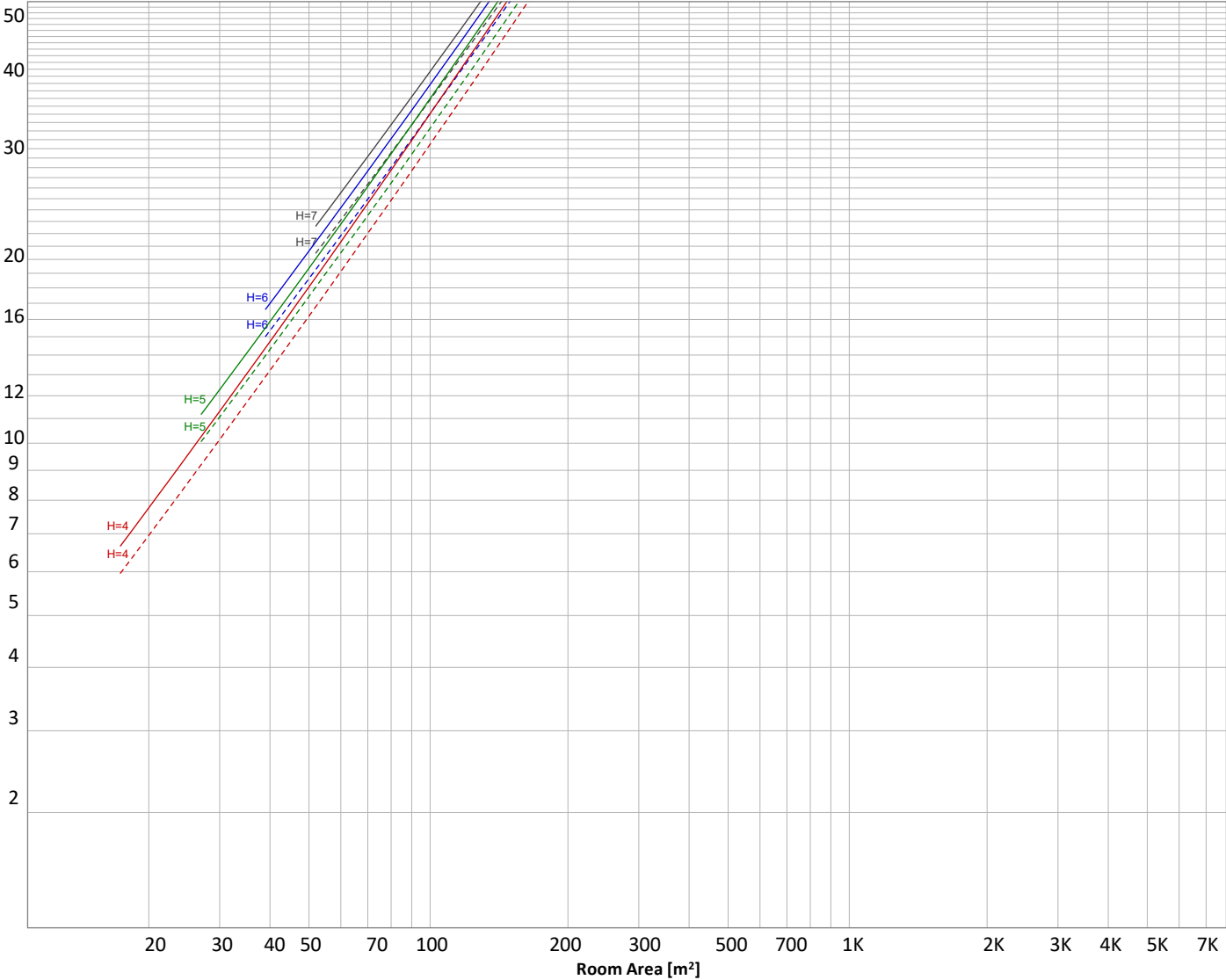
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Operator:



Luminaire budgetary diagram

Uncorrected, comprehensive UGR table according to 117-1995

LAMPS (number of lamps)



Conditions

H = Room height	Flux = 347 lm	p(%)		
H _{down} = Lamp distance from ceiling =	0.00 m	Line type	Ceiling reflectance	Wall reflectance
H _{work} = Work area height from floor =	0.00 m	-----	70	50
E _{work} = Average lux on work area =	100 lx	-----	50	30
				Floor reflectance
				20

Zonal Lumen Summary

0°-10°	10°-20°	20°-30°	30°-40°	40°-50°	50°-60°	60°-70°	70°-80°	80°-90°
87,1 lm	124 lm	66,0 lm	34,0 lm	16,5 lm	9,25 lm	5,74 lm	3,03 lm	0,814 lm
90°-100°	100°-110°	110°-120°	120°-130°	130°-140°	140°-150°	150°-160°	160°-170°	170°-180°
0,110 lm	0,092 lm	0,086 lm	0,085 lm	0,076 lm	0,071 lm	0,071 lm	0,059 lm	0,018 lm

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Outdoor Light Planning

Lumen per Zone

Zone (γ)	Lumen	% Total
0-10°	87 lm	25,1%
10-20°	124 lm	35,8%
20-30°	66 lm	19,0%
30-40°	34 lm	9,8%
40-50°	17 lm	4,8%
50-60°	9 lm	2,7%
60-70°	6 lm	1,7%
70-80°	3 lm	0,9%
80-90°	1 lm	0,2%
90-100°	0 lm	0,0%
100-110°	0 lm	0,0%
110-120°	0 lm	0,0%
120-130°	0 lm	0,0%
130-140°	0 lm	0,0%
140-150°	0 lm	0,0%
150-160°	0 lm	0,0%
160-170°	0 lm	0,0%
170-180°	0 lm	0,0%
Total	347 lm	100,0%

Intensity peaks

Max intensity	1094 cd
Intensity, 90°	0 cd
Intensity, 0°	1069 cd

Zonal Lumen summary

Zone (γ)	Lumen	% Total
0-30°	277 lm	79,8%
0-40°	311 lm	89,6%
0-60°	337 lm	97,0%
60-90°	10 lm	2,8%
70-100°	4 lm	1,1%
90-120°	0 lm	0,1%
0-90°	347 lm	99,8%
90-180°	1 lm	0,2%
0-180°	347 lm	100,0%

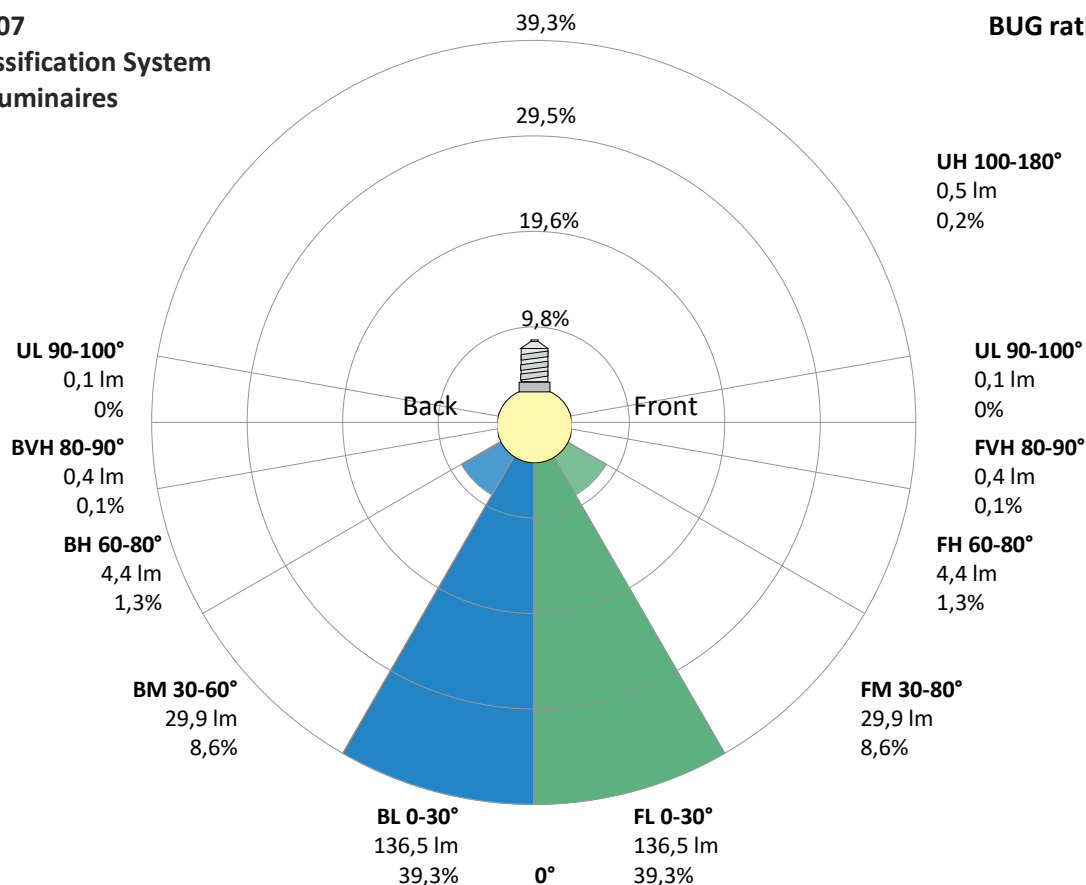
BUG rating

	Lumen	% Total
Forward light		
Low(0-30°)	136 lm	39,3%
Medium(30-60°)	30 lm	8,6%
High(60-80°)	4 lm	1,3%
Very high(80-90°)	0 lm	0,1%
Back light		
Low(0-30°)	136 lm	39,3%
Medium(30-60°)	30 lm	8,6%
High(60-80°)	4 lm	1,3%
Very high(80-90°)	0 lm	0,1%
Uplight		
Low(90-100°)	0 lm	0,0%
High(100-180°)	1 lm	0,2%

IESNA TM-15-07

Luminaire Classification System For Outdoor Luminaires

BUG rating B1 U1 G0



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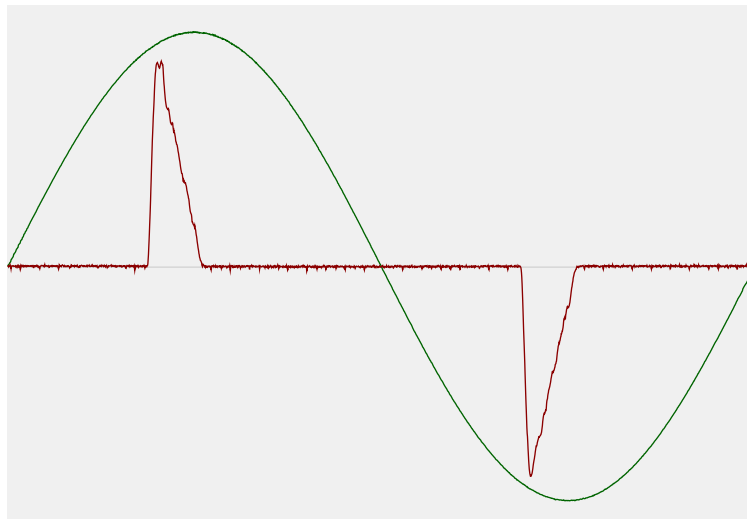


Power Details

Input Power

Power feed to light source	3,7 W
Frequency of input power	50 Hz
RMS Input voltage feed, V_{RMS}	230 V
RMS Input current feed, I_{RMS}	0,036 A
Volt-Ampere or apparent power = $V_{RMS} * I_{RMS}$	8,24 VA
Displacement factor of AC power feed	0,97
Power factor of AC current feed	0,45
Total harmonic distortion of the current	187,74%
Total harmonic distortion of the voltage	0,08%

Input Power Curve



Efficiency

Radiated power efficiency 28,2%



Lumen efficiency 93 lm/W



Stabilization Details

Warmup Conditions

Stable period	15 min
Stable change max	2,0%
Minimum time	15 min

Color Temperature Change

CCT start	2694 K
CCT shift	+6 K
CCT end	2700 K

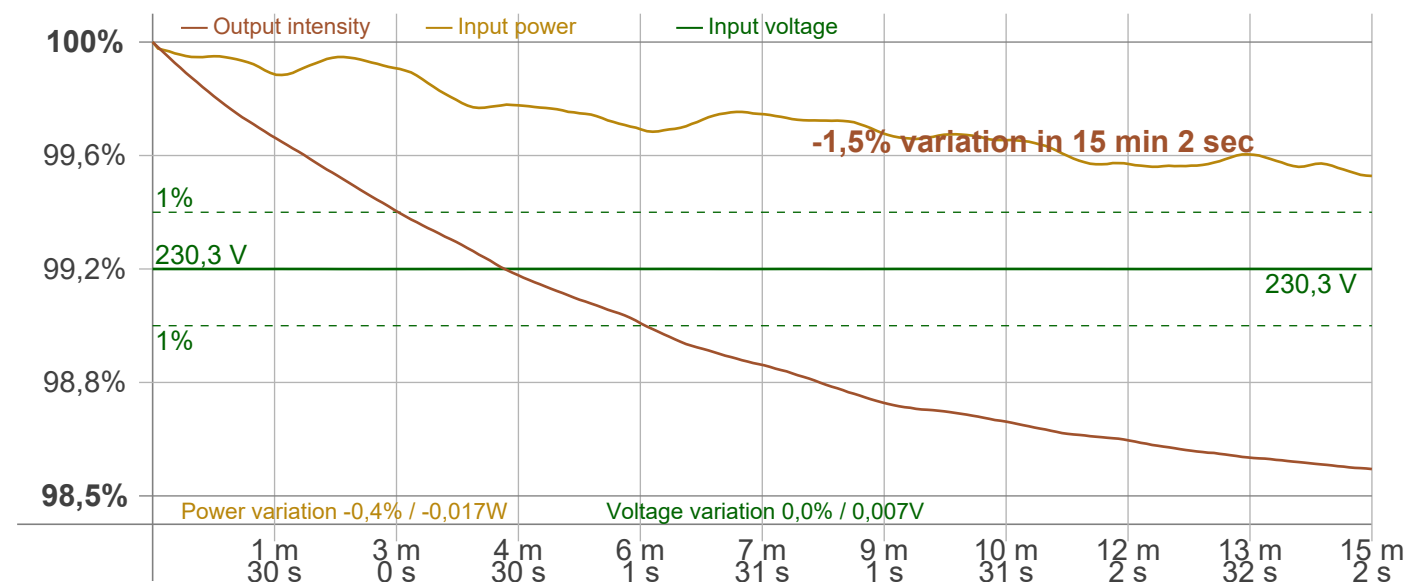
Warmup Result

Total warmup time	Lamp stabilized in 15 min 2 sec
Warmup variation	-1,5%

Output Change

Output start	353 lm
Output change	-5 lm
Output end	347 lm

Stabilization Curve



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Flicker /TLA details

Flicker Meter Type Viso Systems LabFlicker
Frequency of input power 50 Hz
Flicker/TLA sample rate 20000 samples/s

Measurement time
PstLM 180 sec
All other indices 1,2 sec

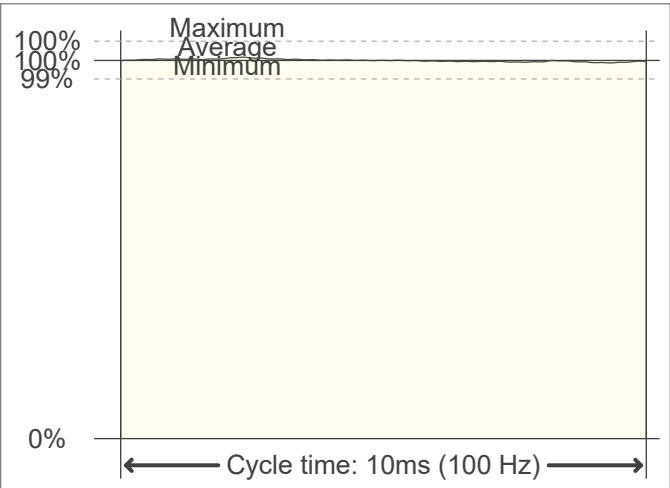
Flicker indices according to Illuminating Engineering Society (IES)
Flicker frequency 100 Hz
Percent Flicker 0,93 %
Flicker index 0

Flicker indices according to California Energy Commission (CEC) 2016b
JA8/10 40 Hz 0,13 %
JA8/10 90 Hz 0,16 %
JA8/10 200 Hz 0,67 %
JA8/10 400 Hz 0,8 %
JA8/10 1000 Hz 0,85 %

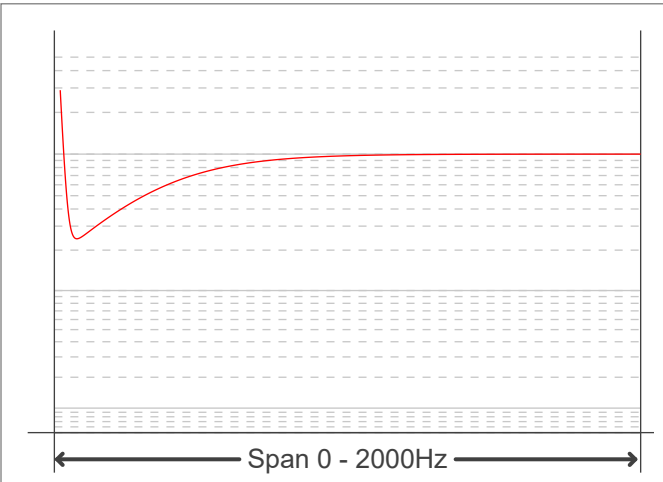
TLA indices (re IEC TR 61547-1, IEC 61000-3-3 and IEC 61000-4-15)
PstLM value (F < 80 Hz) 0,07
SVM value (80 < F < 2000 Hz) 0,02

Flicker indices according to Lighting Research Center (2015)
Perception metric, Assist Mp 0,1

Flicker frame (frame of one flicker period in time domain)



Flicker FFT (flicker curve in frequency domain)



IEEE 1789 Frequency/modulation plot

